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(54) Adaptable scanner/printer device

(57) The device (1) comprises a scanner unit (2) and a printer unit (3), both units (2, 3) being connected to a control unit (4) and a communications module (5) of external devices which module comprises a communications unit (6) and an interface, preferably a PCMCIA interface (7); the communications unit (6) being arranged to handle the control of the data communications transmitted through the interface (7), and a circuit card, preferably a PCMCIA card (9), being adapted to the card slot (8) of the interface (7), the functions of the scanner/printer device being defined and managed by means of and through the PCMCIA card. The scanner/printer device can thus be used as a printer, a scanner and a transmitting and receiving telefax device.

The device is connected by line or infra-red to external devices (12), such as a laptop computer, mobile phone, or LAN, via the card (9).

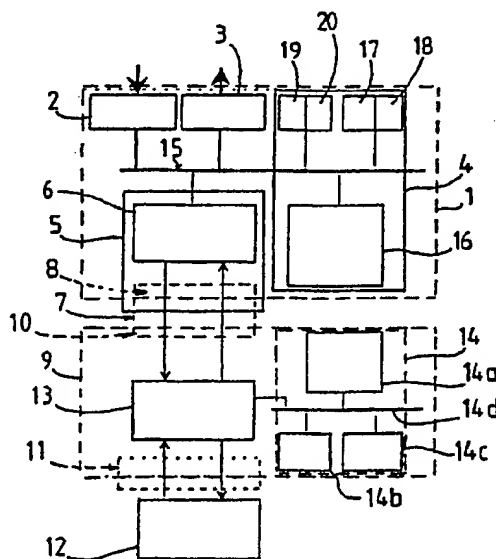


FIG. 1

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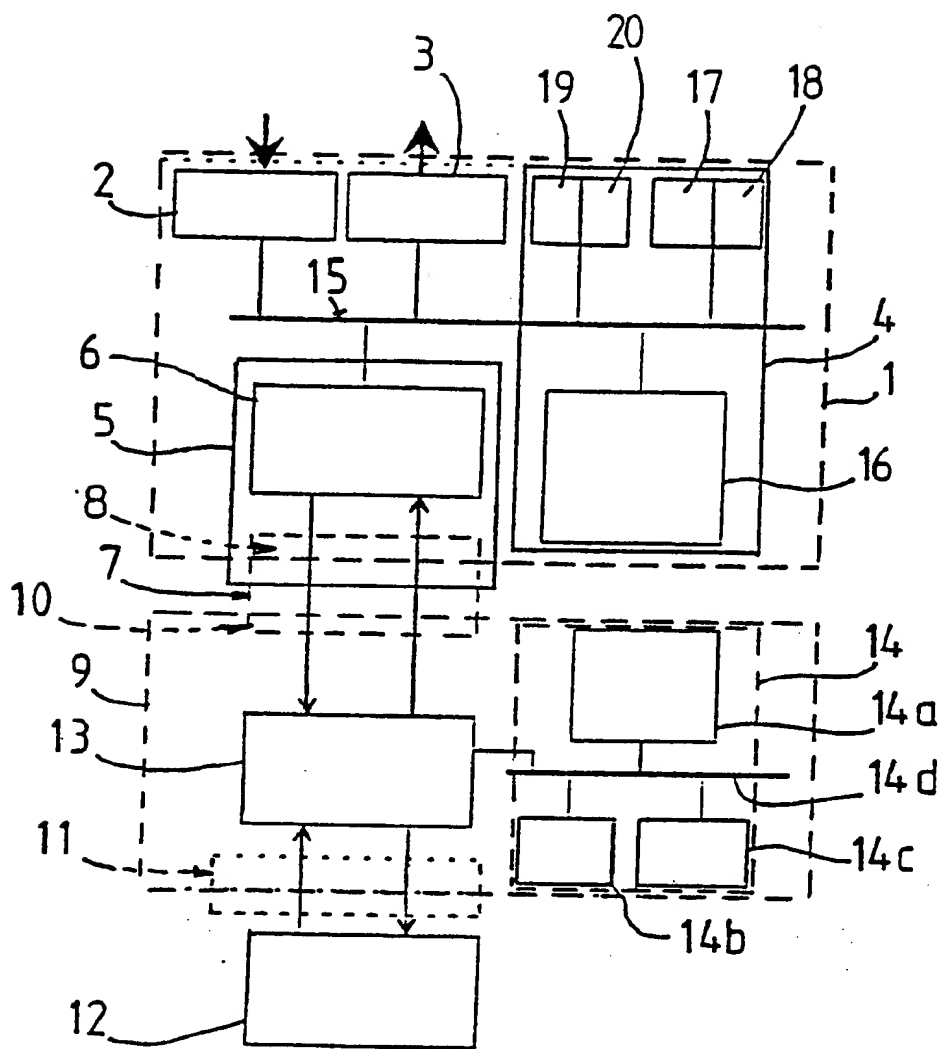


FIG. 1

FIG. 2

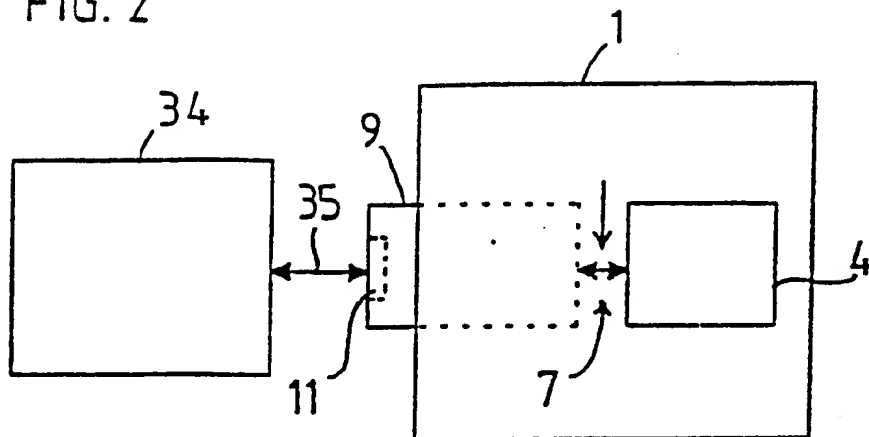


FIG. 3

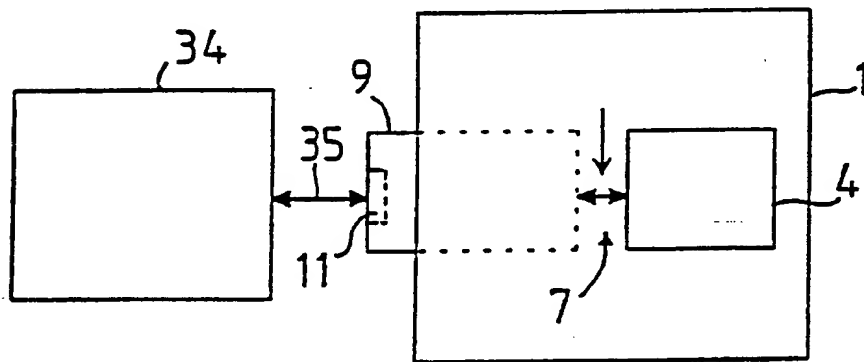


FIG. 4

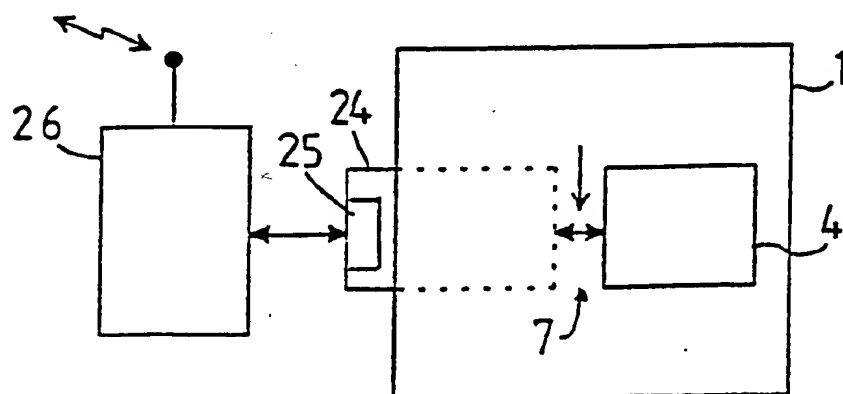


FIG. 5

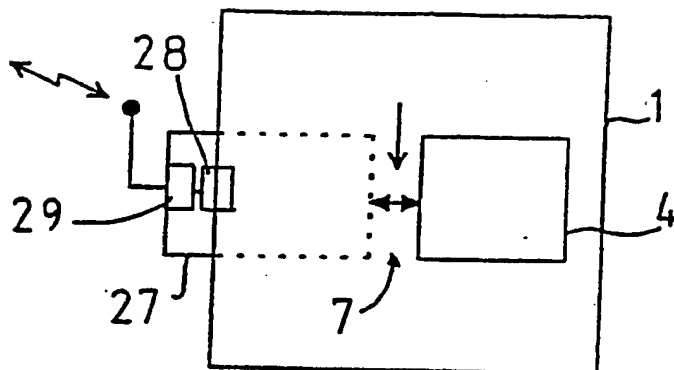


FIG. 6

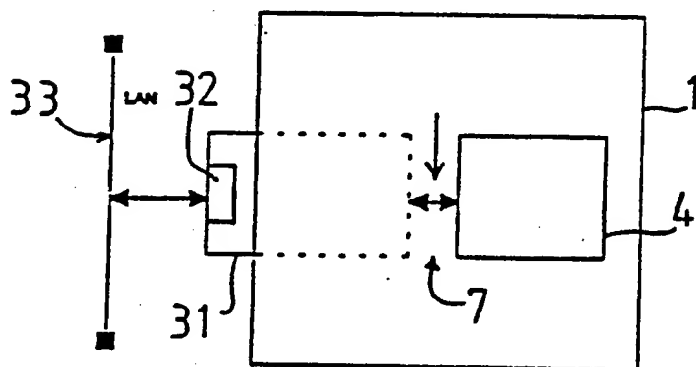
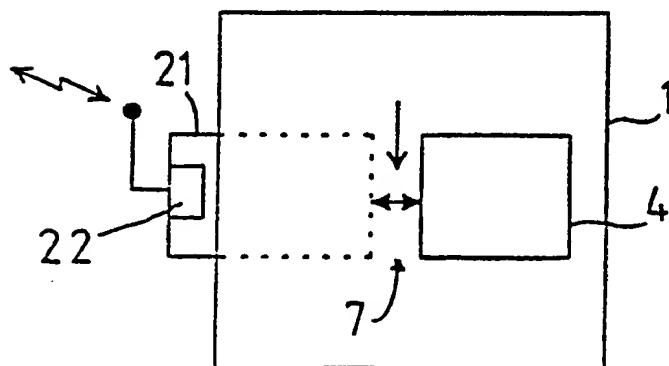


FIG. 7



SCANNER/PRINTER DEVICE

The object of the invention is a scanner/printer device as defined in the introduction of Claim 1.

Scanner and printer devices are known in the art which function in a predefined way in their own limited environment. The printer and scanner devices are generally separate devices, though they can be used in connection with one and the same personal computer. Telefaxes comprising a scanner and printer device part are an exception to the common practice.

The purpose of the invention is to disclose a new scanner/printer device which can be used in different environments if a few alterations are made. The scanner/printer device according to the invention is characterized in what is described in Claim 1.

The scanner/printer device according to the invention includes a scanner unit and an output unit, both units being connected to a control unit and a communications module for external devices. According to the invention the communications module for external devices includes a communications unit and an interface such as a PCMCIA interface, the communications unit being arranged to control the data communications transmitted through the interface. A circuit card such as a PCMCIA card is adapted to the card slot of the interface, the functions of the scanner/printer device being defined and managed using the PCMCIA card.

An advantage of the scanner/printer device according to the invention is that it can be easily modified to different requirements of use. The device is a common peripheral device such as a scanner, a printer, or a telefax device having a connection interface such as a PCMCIA interface connected thereto, and the functions of the peripheral device can be defined using a corresponding card, which is connected to the PCMCIA interface. If the use of the device is altered, the properties of the scanner/printer device can be altered by simply replacing the

previously used circuit card, such as a PCMCIA card, with another corresponding card provided with appropriately modified properties. Thus it is easy to make the scanner/printer device to operate as a scanner and correspondingly as an printer when required. The device can be connected to a local area network by means of a suitable card. In addition, it is easy to convert the scanner/printer device into a transmitting and receiving telefax device.

It is preferable to use a PCMCIA interface as the device's connection interface according to the invention. The Personal Computer Memory Card International Association, i.e., the PCMCIA, has been made to advance the convertability of intergrated circuit cards in computers and other electronic products. The PCMCIA cards are standardized cards which are suitable for memory cards, expansion cards etc. The PCMCIA cards described herein are based on the standard in question and on its possible expansions in the future. However, it should be noted that the invention can be applied to other types of defined interfaces as well as to circuit cards which use such interfaces.

The invention is described in more detail in the following with reference to the appended drawings in which:

Figure 1 illustrates a block diagram of the scanner/printer device according to the invention;

Figure 2 illustrates the adaptation of the scanner/printer device into an printer;

Figure 3 illustrates the adaptation of the scanner/printer device into a scanner;

Figure 4 illustrates the adaptation of the scanner/printer device into a data transmission device connected to a telephone;

Figure 5 illustrates the connection of the scanner/printer device directly to a mobile phone network using a PCMCIA card;

Figure 6 illustrates the connection of the scanner/printer device to a local network by means of a PCMCIA card; and

Figure 7 illustrates a wireless connection of the scanner/printer device to an external device by means of a PCMCIA card.

Figure 1 illustrates scanner/printer device 1 according to the invention. This device comprises scanner unit 2 and printer unit 3, both units 2, 3 being connected to control unit 4 and communications module 5 of external devices. Control unit 4 includes central processor unit 16 such as a microprocessor, and a number of memory units 17, 18, 19 and 20. Communications module 5 of external devices comprises communications unit 6 and PCMCIA interface 7. Communications unit 6 is arranged to control the data communications transmitted through PCMCIA interface 7. PCMCIA card 9 is adapted to the card slot of PCMCIA interface 7 and to PCMCIA card slot and 8, the functioning of scanner/printer device 1 being defined and/or managed with PCMCIA card 9. Scanner unit 2, printer unit 3, central processor unit 16 of control unit 4, and memory units 17, 18, 19 and 20 as well as communications unit 6 are connected to each other via data transmission bus 15. In this way the operation of scanner unit 2 and printer unit 3 can be effectively controlled with central processor unit 16.

In addition to connection interface 10 of scanner/printer device 1, PCMCIA card 9 preferably comprises another interface 11 for the connection of external devices to scanner/printer device 1 through PCMCIA card 9. Communications unit 13 and control unit 14 are included in PCMCIA card 9, and the data communications between communications unit 6 of scanner/printer device 1 and the additional functional unit of PCMCIA card 9 and/or the external device connected to PCMCIA card 9 is managed through communications unit 13. Control unit 14 includes central processor unit 14a and a number of memory units 14b, 14c which are connected to data transmission bus 14d together with communications unit 13.

The memory units of control unit 4 further include output program memory unit 17 and output memory unit 20. Output program memory unit 17 is preferably

implemented as a ROM memory unit and output memory unit 20 as a RAM memory unit. An output program, such as PostScript (TM)-interpreter, is recorded in output program memory unit 17, when a laser printer is used as output unit 3. Scanner/printer device 1 is arranged, using the output program, to operate as a printer device. The data written by printer unit 3 is collected in output memory unit 20.

The memory units of control unit 4 further include facsimile memory unit 18, which is preferably implemented as a ROM memory unit. A facsimile program is recorded in this memory unit to arrange scanner/printer device 1 into a device such as a telefax device processing data in a facsimile form.

Image memory unit 19 is further included in the memory units of control unit 4 and preferably implemented as a RAM memory unit. The data flow from scanner unit 2 is recorded in this memory unit, controlled by central processor unit 16, when scanner/printer device 1 is arranged to operate as a scanner.

Scanner unit 2 can be implemented as an opto-electric scanner. The structure of the scanner can be of a type known per se. Scanner unit 2 is used to identify an image, a text page or corresponding information generally presented on a paper or the like and fitted to the reading drive, by lighting the surface of the paper with a suitable light fitting and by collecting the light reflected therefrom, using mirror and lens arrangements, on a light-sensitive sensor arranged in a suitable manner. The whole area to be read in the reading drive is scanned by the mirror and lens arrangements, and the variations in the amount of light recorded by the light-sensitive sensor are stored in image memory unit 19 which is in connection with scanner unit 2.

Printer unit 3 can be implemented as an output device controlled electronically, preferably as a laser printer or the like. The printer itself can be of a known structure. The laser element of the laser printer is controlled according to the data flow from control unit 4, and the laser beam is brought, through the mirror and lens arrangement, on a drum coated with light-sensitive material where the drum is

scanned line by line by the beam. The data is written on the drum using the laser light by forming an electrostatic image on it. The image formed on the drum is fixed on a paper with a development unit.

Scanner/printer device 1 is used as an output device of the application in Figure 2. PCMCIA card 9 is fitted to PCMCIA card slot 8 and provided with another interface 11. Scanner/printer device 1 and PCMCIA card 9 are connected through this interface 11 to external personal computer 34, such as a laptop computer, via suitable connection cable 35. In this application scanner/printer device 1 functions as a conventional output device, which is connected to the output port (serial or parallel port) of personal computer 34. Thus the PCMCIA card transmits the bits of the data flow from the computer via interface 7 of scanner/printed device 1 and via communications unit 6 to output memory unit 20, from where it is further output by printer unit 3 using central processor unit 16 of control unit 4 and utilizing the output program, such as the PostScript (TM)-interpreter, stored in output program memory unit 17.

Scanner/printer device 1 is used as a scanner in the application according to Figure 3. The image information read by scanner unit 2 is transmitted further as a data flow, controlled by central processor unit 16, to image memory unit 19 such as a RAM memory unit. The data of image memory unit 19 is processed using the facsimile program recorded in the facsimile memory unit 18 so that the signal transmitted through communications unit 6 and further through PCMCIA interface 7 and PCMCIA card 9 to the personal computer consists of data in a facsimile form. The image information is thus converted into a form which is easy to process by personal computer 34. The processed image information is transmitted in the facsimile form as a simple string of bits to computer 34, where it can be further processed in the desired way using suitable image processing programs known per se, for example. It is also possible to simply transfer the image information read by scanner unit 2 through communications unit 6 and PCMCIA interface 7 to PCMCIA card 9 and further to computer 34 as raw bit data, and the processing of this data is handled in computer 34 with the telefax software. PCMCIA card 9 is preferably similar in the application of scanner/printer device 1 of Figures 2 and 3.

Scanner/printer device 1 is used as a data transmission device, preferably as a facsimile device, in the application of Figure 4. PCMCIA card 24 including modem 25 or a similar adapter is fitted into card slot 8 of PCMCIA interface 7. Modem 25 is used in analog data transmission systems. In digital data transmission systems, such as the GSM, an adapter corresponding to modem 25 is arranged in PCMCIA card 24. The adapter preferably functions in the manner of a modem when commands of the Hayes-AT type are used. Mobile phone 26 or a conventional telephone set is connected to this PCMCIA card 24 as an external device. All the intelligence required in the control procedures of telefax transmissions is included in PCMCIA card 24 and in output device 1, especially in its facsimile memory unit 18. The commands by which scanner/printer device 1 functioning as a telefax device and PCMCIA card 24 interact, are known per se and conform to the telefax interface defined in the standards.

Figure 5 illustrates an application of scanner/printer device 1 where modem 28 or a like adapter and cellular phone unit 29 are connected to PCMCIA card 27. This application functions in the same manner as the application of the connection in Figure 4 described above. The only difference is that no separate telephone set external to PCMCIA card 27 is required in this application.

In the application of Figure 6, scanner/printer device 1 is connected to local area network 33 with PCMCIA card 31. In this application PCMCIA card 31 includes network operating unit 32 through which scanner/printer device 1 is connected to said local area network 33. Network 33 is, for instance, an Ethernet (TM)-network or a corresponding local area network known per se. In this case, PCMCIA card 31 comprises an appropriate network operating system, loaded to network operating unit 32. It is preferably loaded to the PCMCIA card's memory unit which is preferably implemented as a ROM memory unit. Due to the network operating system, PCMCIA card 31 looks like a conventional controller with respect to network 33, i.e., it has its own physical network address.

The data coming from the local area network is buffered into the memory unit, such as a RAM memory unit, of PCMCIA card 31, while the network operating

system disassembles the local area network packages into the form of raw data. The file is written from the RAM memory unit of PCMCIA card 31, as described above in connection with the application of Figure 1, i.e., the data to be written is transferred from the RAM memory unit of PCMCIA card 31 to output memory unit 20 of scanner/printer device 1, and the file is written by output unit 3 using the PostScript (TM)-interpreter, for example.

The other interface 11 of the PCMCIA cards, shown in Figure 1, used in connection with scanner/printer device 1 can also be implemented using an infrared linkage, as illustrated in Figure 7. In this application, PCMCIA card 21, which comprises infrared transmitter/receiver unit 22, is fitted into card slot 8 of PCMCIA interface 7 of scanner/printer device 1. Scanner/printer device 1 can be connected wirelessly to the external devices through this transmitter/receiver unit 22. It is an alternative to the wire communications to external devices, which are described in connection with the applications of Figures 2, 3, 4 and 6.

The data transmission across PCMCIA interface 7 of scanner/printer device 1 is effected according to the PC-FAX and/or PC-AT standards. The PC-FAX interface standards are documented facsimile standards which are known per se. The PC-AT interface in this context refers to the serial or parallel port standard of personal computers, such as the RS-232 serial interface and the Centronix parallel interface standards which are very well documented and known per se in general literature in the field. Telefax software, such as Winfax (TM) and Faxability (TM), which are generally used in connection with personal computers, can be used as the facsimile software.

The invention is described above with reference to some preferred embodiments thereof, but it is obvious that the invention can be altered in various ways within the appended Claims.

CLAIMS

1. Scanner/printer device (1) comprising a scanner unit (2) and an output unit (3), both units (2, 3) being connected to a control unit (4) and to a communications module (5) of external devices, characterized in that the communications module (5) of the external devices comprises a communications unit (6) and an interface, such as a PCMCIA interface (7); the communications unit (6) being arranged to handle the control of the data communications transmitted through the interface (7), and a circuit card such as a PCMCIA card (9) being fitted into the card slot (8) of the interface (7), the functions of the scanner/printer device being defined and managed by means of and through the PCMCIA card.
2. A scanner/printer device according to Claim 1, characterized in that the circuit card, such as the PCMCIA card (9), comprises another interface (11) with respect to the connection interface (10) of the scanner/printer device for connecting external devices (12) to the scanner/printer device (1) through the card (9).
3. A scanner/printer device according to Claim 1 or 2, characterized in that the circuit card, such as the PCMCIA card (21) comprises, as the second interface (11), an infrared transmitter/receiver unit (22) via which the scanner/printer device (1) can have a wireless connection with external devices.
4. A scanner/printer device according to Claim 1, 2 or 3, characterized in that the circuit card, such as the PCMCIA card (9) comprises a communications unit (13) and a control unit (14), the data communications being handled, through the communications unit (13), between the communications unit (6) of the scanner/printer device (1) and the supplementary functional unit of the card (9) and/or the external device connected to the card (9).
5. A scanner/printer device according to Claims 1, 2, 3 and 4, characterized

in that the control unit (4) comprises a central processor unit (16) and a number of memory units (17, 18), and that the scanner unit (2), the printer unit (3), the central processor unit (16) of the control unit (4) as well as the memory units (17, 18) and the communications unit (6) are connected to each other via a data transmission bus (15).

6. A scanner/printer device according to Claim 5, characterized in that the memory units comprise an output program memory unit (17) and an output memory unit (20); an output program, such as the PostScript(TM)-interpreter, being recorded in the output program memory unit (17) for arranging the scanner/printer device (1) into an output device, and data to be written is collected in the output memory unit (20).
7. A scanner/printer device according to Claim 5 or 6, characterized in that the memory units comprise a facsimile memory unit (18) in which a facsimile program is recorded for arranging the scanner/printer device (1) into a device processing data in facsimile form.
8. A scanner/printer device according to Claim 5, 6 or 7, characterized in that the memory units comprise an image memory unit (19); the data flow from the scanner unit (2) being directed to the image memory unit, controlled by the central processor unit (4), when the scanner/printer device (1) is arranged to function as a scanner.
9. A scanner/printer device according to Claim 7, characterized in that the circuit card, such as the PCMCIA card (24) comprises a modem (25) or a similar adapter.
10. A scanner/printer device according to Claim 7, characterized in that the circuit card, such as the PCMCIA card (27) comprises a modem (28) or a similar adapter and a cellular phone unit (29).
11. A scanner/printer device according to Claim 7, characterized in that the

circuit card, such as the PCMCIA card (31) comprises a network operating unit (32) through which the scanner/printer device (1) is connected to a local area network (33).

12. A scanner/printer device according to any of the preceding Claims, characterized in that the interface (7) is arranged according to the PC-FAX and/or the PC-AT standards.



The Patent Office

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Claims searched: 1-12

Examiner: Keith Williams
Date of search: 30 May 1995

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Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
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Other: online WPI

Documents considered to be relevant:

| Category | Identity of document and relevant passage | Relevant to claims |
|----------|--|--------------------|
| X,P | EP 0610025 A1 A T & T Corp. - see column 1, lines 10-32, and column 4, lines 13-18 | 1-3,9 |
| X | EP 0580321 A1 Esselte Dymo - see page 2, lines 26-40 | 1 at least |
| X | EP 0572665 A1 Seiko Epson - see abstract | 1 at least |
| X | EP 0562467 A1 K K Toshiba - see abstract | 1 at least |
| X | EP 0456410 A2 I B M Corp. - see Fig. 1 | 1 at least |
| X | EP 0452115 A2 Canon K K - see abstract | 1 at least |
| X | WO94/01822A1 Gemplus Card International - see abstract | 1-3,9 |
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